Space Weather Forecast

Issued on Sunday, 23 January 2022 at 00:16 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight daily chance of G1/Minor Geomagnetic Storms from possible Coronal Mass Ejections (CMEs) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Very Low in the past 24 hours, with no significant X-ray flares recorded. There are now just two sunspots on the visible disc, both small and simple groups.

A filament lift off from the northeast quadrant which began around 22/0630UTC, produced a CME. Although most of the ejecta was directed away from Earth, initial modelling indicates a possible glancing pass late 25th or early 26th. No other Earth-directed CMEs have been observed in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind was at slightly elevated to background levels, often steady but with an overall slight downward trend. The Total Interplanetary Magnetic Field has been weak, with the important north-south component also weak although predominantly southward directed. Geomagnetic activity has been Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed this period. However, the high energy particle flux was still just slightly elevated, and continued to slowly decline towards background levels following the recent S1/Minor solar radiation storm event.

Four-Day Space Weather Forecast Summary

Solar Activity: There is initially a very slight but soon diminishing chance of isolated Moderate-class flares, as the more active region over the western limb continues to rotate further away. Very Low solar activity is then expected, with a slight chance of Common-class flares.

Solar Wind / Geomagnetic Activity: There are several glancing CMEs possible in the forecast period, potentially one each day of the period. A CME from 19th Jan is possible on the 23rd. On the 24th two CMEs, one from the 20th and another from 21st Jan, could also possibly glance past Earth. Then late 25th or early 26th a CME from 22nd could glance past Earth. In the absence of the CMEs above, solar winds are expected to initially be background to slightly elevated, with an increasing chance of high speed stream influence developing from the second half of 23 Jan onwards.

The resultant forecast is very low confidence in timing and phasing of G1 risk, but higher for this being the maximum attained geomagnetic activity. In the absence of any CMEs, Quiet to Unsettled activity should give way to more frequent Unsettled periods, with a chance of isolated Active intervals, from later Day 1 (23rd) associated with coronal hole influences.

Energetic Particles / Solar Radiation: The risk of solar radiation storms is forecast to soon

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return to Background levels.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	20	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	2	1	1	1
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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